

✓ 54S/74S289 011743  
 ✓ 54LS/74LS289 011748

**64-BIT RANDOM ACCESS MEMORY**  
 (With Open-Collector Outputs)

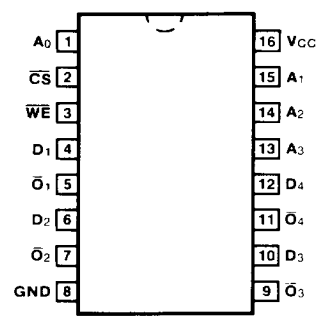
**DESCRIPTION** — The '289 is a high speed 64-bit RAM organized as a 16-word by 4-bit array. Address inputs are buffered to minimize loading, and addresses are fully decoded on-chip. Outputs are open-collector type and are in the off (HIGH) state whenever the Chip Select (CS) input is HIGH. The outputs are active only in the Read mode; output data is the complement of the stored data.

- OPEN-COLLECTOR OUTPUTS FOR WIRED-AND APPLICATIONS
- BUFFERED INPUTS MINIMIZE LOADING
- ADDRESS DECODING ON-CHIP
- DIODE CLAMPED INPUTS MINIMIZE RINGING

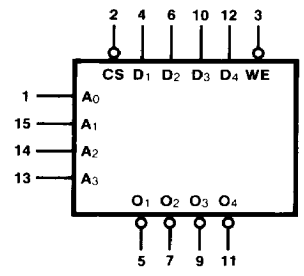
**ORDERING CODE:** See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V <sub>CC</sub> = +5.0 V ±5%, T <sub>A</sub> = 0°C to +70°C	V <sub>CC</sub> = +5.0 V ±10%, T <sub>A</sub> = -55°C to +125°C	
Plastic DIP (P)	A	74S289PC, 74LS289PC		9B
Ceramic DIP (D)	A	74S289DC, 74LS289DC	54S289DM, 54LS289DM	6B
Flatpak (F)	A	74S289FC, 74LS289FC	54S289FM, 54LS289FM	4L

**CONNECTION DIAGRAM**  
 PINOUT A



**LOGIC SYMBOL**



V<sub>CC</sub> = Pin 16  
 GND = Pin 8

**INPUT LOADING/FAN-OUT:** See Section 3 for U.L. definitions

PIN NAMES	DESCRIPTION	54/74S (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
A <sub>0</sub> — A <sub>3</sub>	Address Inputs	0.63/0.16	0.5/0.013
CS	Chip Select Input (Active LOW)	0.63/0.16	0.5/0.013
WE	Write Enable Input (Active LOW)	0.63/0.16	0.5/0.013
D <sub>1</sub> — D <sub>4</sub>	Data Inputs	0.63/0.16	0.5/0.013
O <sub>1</sub> — O <sub>4</sub>	Inverted Data Outputs	OC*/10	OC*/10 (5.0)

\*OC — Open Collector

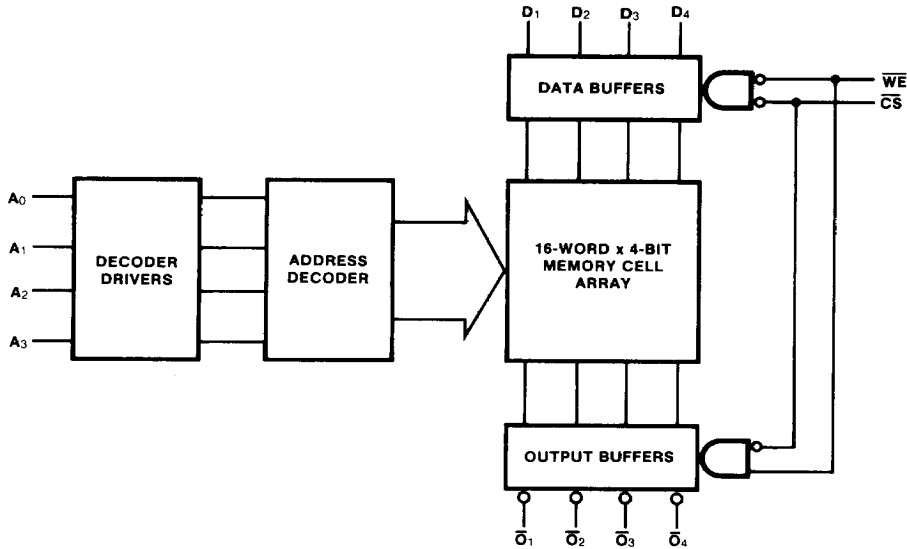
FUNCTION TABLE

INPUTS		OPERATION	CONDITION OF OUTPUTS
CS	WE		
L	L	Write	Off (HIGH)
L	H	Read	Complement of Stored Data
H	X	Inhibit	Off (HIGH)

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Immaterial

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LOGIC DIAGRAM



**DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE** (unless otherwise specified)

SYMBOL	PARAMETER		54/74S		54/74LS		UNITS	CONDITIONS	
			Min	Max	Min	Max			
VOL	Output LOW Voltage	XM	0.5		0.4		V	$V_{CC} = \text{Min}$ $I_{OL} = 16 \text{ mA (S289)}$ $I_{OL} = 8.0 \text{ mA (54LS289)}$ $I_{OL} = 16 \text{ mA (74LS289)}$	
		XC	0.45		0.5				
IOH	Output HIGH Current		40	100	20	100	$\mu\text{A}$	$V_{OH} = 2.4 \text{ V}$ $V_{OH} = 5.5 \text{ V}$	$V_{CC} = \text{Min}$
ICC	Power Supply Current		105		40		mA	$V_{CC} = \text{Max}$	

**AC CHARACTERISTICS OVER RECOMMENDED  $V_{CC}$  AND  $T_A$  RANGE** (unless otherwise specified)

SYMBOL	PARAMETER		54/74S		54/74LS		UNITS	CONDITIONS	
			$C_L = 30 \text{ pF}$		$C_L = 15 \text{ pF}$				
			$R_L = *$		$R_L = 2 \text{ k}\Omega$				
			Min	Max	Min	Max			
tPLH	Access Time, HIGH or LOW, $A_n$ to $\overline{O}_n$	XM	50		37**		ns	Figs. 3-2, 3-20	
tPHL		XC	35		37**				
tPHL	Access Time $\overline{CS}$ to $\overline{O}_n$	XM	25		10**		ns	Figs. 3-2, 3-5	
		XC	17		10**				
tPLH	Disable Time $\overline{CS}$ to $\overline{O}_n$	XM	20				ns		
		XC	17						
tPHL	Recovery Time $\overline{WE}$ to $\overline{O}_n$	XM	40		30**		ns	Figs. 3-2, 3-4	
		XC	35		30**				
tPLH	Disable Time $\overline{WE}$ to $\overline{O}_n$	XM	30				ns		
		XC	25						

**AC OPERATING REQUIREMENTS OVER RECOMMENDED  $V_{CC}$  AND  $T_A$  RANGE** (unless otherwise specified)

SYMBOL	PARAMETER		54/74S		54/74LS		UNITS	CONDITIONS	
			Min	Max	Min	Max			
t <sub>s</sub> (H)	Setup Time, HIGH or LOW		0		10**		ns	Fig. 3-21	
t <sub>s</sub> (L)	$A_n$ to $\overline{WE}$		0		10**				
t <sub>h</sub> (H)	Hold Time, HIGH or LOW		0		0**		ns		
t <sub>h</sub> (L)	$A_n$ to $\overline{WE}$		0		0**				
t <sub>s</sub> (H)	Setup Time, HIGH or LOW		20		25**		ns	Fig. 3-13	
t <sub>s</sub> (L)	$D_n$ to $\overline{WE}$		20		25**				
t <sub>h</sub> (H)	Hold Time HIGH or LOW		0		0*		ns		
t <sub>h</sub> (L)	$D_n$ to $\overline{WE}$		0		0*				
t <sub>s</sub> (L)	Setup Time LOW $\overline{CS}$ to $\overline{WE}$		0				ns	Fig. 3-14	
t <sub>h</sub> (L)	Hold Time LOW $\overline{CS}$ to $\overline{WE}$		0				ns	Fig. 3-13	
t <sub>w</sub> (L)	$\overline{WE}$ Pulse Width LOW		20		25**		ns	Fig. 3-14	

\* $R_L = 300 \Omega$  to  $V_{CC}$  and  $600 \Omega$  to Gnd.

\*\*Typical Value

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